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RETURN RECEIPT REQUESTED

STATE OF TENNESSEE
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
JOHNSON CITY ENVIRONMENTAL FIELD OFFICE
2305 SILVERDALE ROAD
JOHNSON CITY, TENNESSEE 37601-2162
(423) 854-5400 STATEWIDE 1-888-891-8332 FAX (423) 854-5401

February 12, 2013

Mr. Don Frawley
Plant Manager
AGC Flat Glass North America – Greenland Plant
600 AFG Road
Church Hill, TN 37642

RE: Compliance Evaluation Inspection
Storm Water Non-Construction Non-Sampling Inspection
AGC Flat Glass North America – Greenland Plant
NPDES Permit TN0002631
Tennessee Storm Water Multi-Sector General Permit for Industrial Activities
(TMSP) TNR051221
Hawkins County

Dear Mr. Frawley:

Tennessee Department of Environment and Conservation, Division of Water Resources personnel performed scheduled inspections at AGC Flat Glass North America – Greenland Plant on December 13 and 17, 2012. The division thanks AGC personnel for their assistance during these inspections. Deficiencies noted during the inspections are detailed below. Also see the enclosed Water Compliance Inspection Reports and Attachment 1 for further detail.

1. Monthly Discharge Monitoring Reports (DMRs) submitted to the division show numerous violations of the Total Phosphorus limitations specified in NPDES permit Part I A. for internal outfall 001. Facility efforts toward identifying the cause and resolving the violations must continue.
2. No sign was in place at internal outfall 002. An outfall sign meeting the requirements of permit Part III C. must be placed and maintained at each facility outfall.
3. The individual primarily responsible for laboratory analyses performed onsite, Mr. Paul McKenzie, indicated that he taps the outside of the Imhoff cone after 45 minutes during settleable solids tests. This is not consistent with the procedures in Standard Method 2540 F-1997, which specify gentle agitation of the sample near the sides of the cone with a rod or by spinning. Analyses must be performed in accordance with methods prescribed in Title 40 CFR Part 136 as required by NPDES permit Part I B.3.
4. Mr. McKenzie indicated that temperature readings for outfall 004 effluent were performed using the thermometer in the pH meter and probe in the onsite laboratory. However, he indicated the calibration of this equipment had not been checked against a

NIST-certified precision thermometer in some time. Standard Method 2550 B-2000 requires periodic checks. Analyses must be performed in accordance with methods prescribed in Title 40 CFR Part 136 as required by NPDES permit Part I B.3.

5. The equipment used for dissolved oxygen (D.O.) readings at internal outfall 002 is calibrated using barometric pressure. However, the barometer used onsite had not been calibration checked and certified in an indeterminate period of time. If this type of calibration is to be employed for D.O. measurement equipment, a certified barometer must be used to obtain the readings. Also note that such D.O. meter calibrations must be based on uncorrected local barometric pressure rather than corrected (to sea level) readings. Further, documentation of the barometric pressure and meter reading should be maintained. Analyses must be performed in accordance with methods prescribed in Title 40 CFR Part 136 as required by NPDES permit Part I B.3., and records must be kept in accordance with Part I B.4. Proper equipment operation and maintenance is required by Part II A.4.
6. No records were available during the inspection to document calibration check of the internal outfall 002 flow measurement equipment in some time. Mr. McKenzie indicated the equipment likely had not been checked in over a year. Flow equipment (*e.g.*, v-notch weir, ultrasonic level sensor, and associated electronics) must be checked for proper placement and calibration in order to ensure acceptable measurement accuracy. Accurate flow reporting is necessary for compliance with NPDES permit Part I A., and proper equipment operation and maintenance is required by Part II A.4. The flow calculation and totalizer system must be included in these checks. Such checks should be performed at least annually.
7. Mr. McKenzie indicated that flow level measurements for internal outfall 001 are obtained at the v-notch weir plate and those for outfall 004 are sometimes obtained at the downstream end of the converging section of the flume. Based on available flow measurement references such as the *Isco Open Channel Flow Measurement Handbook*, 6th Edition, neither of these measurement locations is appropriate for the types of primary devices (*i.e.*, weir and flume) in place at these outfalls. Flow level readings should be made at appropriate locations in order to ensure acceptable accuracy of flow reporting. Accurate flow reporting is necessary for compliance with NPDES permit Part I A.
8. In part, TMSP Sector E requires identification of exposed materials, potential pollutant sources, and identification and implementation of appropriate control measures to minimize contact of materials to and mobilization in storm water runoff. The SWPPP notes the presence of cullet and raw materials onsite and indicates little to no risk of storm water contamination, but does not appear to address the potential for solids mobilization in storm water runoff. Inspection of the site revealed the presence of substantial amounts of cullet, aggregate, and other raw materials stored outside or spilled into locations where they may be mobilized in storm water runoff from the facility. An apparent storm drain outside the HT3 loading dock was nearly full of sediment at the time of this inspection, and mobilized material from numerous cullet piles was noted around the site. Thus, existing control measures and procedures do not appear to be effective in controlling discharge of solids in storm water runoff from the site. The SWPPP and identified control measures and procedures must be modified to adequately address the requirements of TMSP TNR051221.
9. The facility storm water pollution prevention plan (SWPPP) indicates employee training will be performed annually. No records were available during this inspection to document that the training had been performed as required by TMSP Part 11.E.3.2.3.5

since August 2010. Records for December 2011 were provided after the onsite inspection, but included only a limited number of personnel. Training of all facility personnel involved in storm water pollution prevention must be performed in accordance with permit requirements.

10. Propane and bulk lubricant drums are stored in a diked concrete containment area in front of the main plant. Runoff from this area enters a sump and is to be inspected for possible contamination before draining. At the time of inspection, the drain valve on the piping from the sump was open and unattended. Thus, the containment effectiveness of this area was compromised, and potential existed for contamination of storm water runoff and the surrounding area. Also, there was some evidence of spillage in an adjacent chemical storage building, but the material did not appear to have exited the building.

Permit compliance helps ensure discharges that are protective of downstream fish and aquatic life and water quality. The division requests that you develop and submit a detailed action plan and proposed implementation schedule to achieve permit compliance. The plan must address the points discussed above and must be submitted within 30 days of receipt of this correspondence. Thank you for your efforts to ensure permit compliance and to protect state water quality. If I may be of assistance in matters concerning this report, please contact me at (423) 854-5456.

Sincerely,

Bryan B. Carter
Environmental Protection Specialist
Division of Water Resources
Johnson City Environmental Field Office

BBC/150113043

Enclosures

cc: Mr. Steven Rolfe, Environmental Engineering Manager, AGC Flat Glass North America – Greenland Plant, 600 AFG Road, Church Hill, TN 37642
Mr. Jeff Horton, DWR, Johnson City EFO
DWR Compliance and Enforcement Section, Nashville
File Copy, DWR, Johnson City EFO

EPA

United States Environmental Protection Agency
Washington, D.C. 20460

Water Compliance Inspection Report

SECTION A: National Data System Coding (i.e., PCS)

Transaction Code	NPDES	YR/MO/DAY	Inspection Type	Inspector	Facility Type
N 5	TN0002631	12/12/13	C	S	2

Remarks

Inspection Work Days	Facility Self-Monitoring Evaluation Rating	BI	QA	Reserved
12.0	3	N	N	

SECTION B: Facility Data

Name and Location of Facility Inspected *(For industrial users discharging to POTW, also include POTW name and NPDES permit number)*	Entry Time/Date	Permit Effective Date
AGC Flat Glass North America - Greenland Plant 600 AFG Road Church Hill, TN 37642	12/12/13 9:00 AM	11/5/01
	Exit Time/Date 12/12/17 2:00 PM	Permit Expiration Date 14/2/27
Names of On-site Representative(s)/Title(s)/Phone and Fax Number(s) Steven Rolfe/Environmental Engineering Manager/Phone: (423) 357-2487 Allen Caldwell/EH&S Manager/ Phone: (423) 357-2492 Fax: (423) 357-2640	Other Facility Data *(e.g., SIC NAICS, and other descriptive information)* SIC 3211 Additional facility personnel assisting with inspection: Paul McKenzie, Gary Henderson, Randy Price	
Name, Address of Responsible Official/Title/Phone and Fax Number Don Frawley, 600 AFG Road, Church Hill, TN 37642 Plant Manager Phone: (423) 357-2478 Fax: (423) 357-2640 Contacted ☐ Yes ☒ No		

SECTION C: Areas Evaluated During Inspection *(Check only those areas evaluated)*

X	Permit	X	Self-Monitoring Program		Pretreatment		MS4
X	Records/Reports		Compliance Schedules	X	Pollution Prevention		
X	Facility Site Review	X	Laboratory	X	Storm Water		
X	Effluent/Receiving Waters	X	Operations & Maintenance		Combined Sewer Overflow		
X	Flow Measurement		Sludge Handling/Disposal		Sanitary Sewer Overflow		

SECTION D: Summary of Findings/Comments

(Attach additional sheets of narrative and checklists, including Single Event Violation codes, as necessary)

See included letter, Attachment 1, and Water Compliance Inspection Report for TMSP TNR051221.

Name(s) and Signature(s) of Inspector(s)	Agency/Office/Phone and Fax Numbers	Date
Bryan B. Carter	TDEC-DWR/JC EFO/(423) 854-5456/(423) 854-5401 Fax	
Tina A. Robinson	TDEC-DWR/JC EFO/(423) 854-5453/(423) 854-5401 Fax	
Jeffrey K. Horton	TDEC-DWR/JC EFO/(423) 854-5447/(423) 854-5401 Fax	
Signature of Management QA Reviewer	Agency/Office/Phone and Fax Numbers	Date
Jeffrey K. Horton	TDEC-DWR/JC EFO/(423) 854-5447/(423) 854-5401 Fax	

EPA

United States Environmental Protection Agency
Washington, D.C. 20460

Water Compliance Inspection Report

SECTION A: National Data System Coding (i.e., PCS)

Transaction Code	NPDES	YR/MO/DAY	Inspection Type	Inspector	Facility Type
N 5	TNR051221	12/12/13	~	S	2

Remarks

Inspection Work Days	Facility Self-Monitoring Evaluation Rating	BI	QA	Reserved
12.0	2	N	N	

SECTION B: Facility Data

Name and Location of Facility Inspected *(For industrial users discharging to POTW, also include POTW name and NPDES permit number)*	Entry Time/Date	Permit Effective Date
AGC Flat Glass North America - Greenland Plant 600 AFG Road Church Hill, TN 37642	12/12/13 9:00 AM	09/6/11
	Exit Time/Date 12/12/17 2:00 PM	Permit Expiration Date 14/5/14

Names of On-site Representative(s)/Title(s)/Phone and Fax Number(s)	Other Facility Data *(e.g., SIC NAICS, and other descriptive information)*
Steven Rolfe/Environmental Engineering Manager/Phone: (423) 357-2487 Allen Caldwell/EH&S Manager/ Phone: (423) 357-2492 Fax: (423) 357-2640	SIC 3211 TMSP Sector E
Name, Address of Responsible Official/Title/Phone and Fax Number Don Frawley, 600 AFG Road, Church Hill, TN 37642 Plant Manager Phone: (423) 357-2478 Fax: (423) 357-2640 Contacted ☐ Yes ☒ No	

SECTION C: Areas Evaluated During Inspection *(Check only those areas evaluated)*

X	Permit	X	Self-Monitoring Program		Pretreatment		MS4
X	Records/Reports		Compliance Schedules	X	Pollution Prevention		
X	Facility Site Review		Laboratory	X	Storm Water		
X	Effluent/Receiving Waters	X	Operations & Maintenance		Combined Sewer Overflow		
	Flow Measurement		Sludge Handling/Disposal		Sanitary Sewer Overflow		

SECTION D: Summary of Findings/Comments

(Attach additional sheets of narrative and checklists, including Single Event Violation codes, as necessary)

See included letter, Attachment 1, and Water Compliance Inspection Report for NPDES TN0002631.

Name(s) and Signature(s) of Inspector(s)	Agency/Office/Phone and Fax Numbers	Date
Bryan B. Carter	TDEC-DWR/JC EFO/(423) 854-5456/(423) 854-5401 Fax	
Tina A. Robinson	TDEC-DWR/JC EFO/(423) 854-5453/(423) 854-5401 Fax	
Jeffrey K. Horton	TDEC-DWR/JC EFO/(423) 854-5447/(423) 854-5401 Fax	
Signature of Management QA Reviewer	Agency/Office/Phone and Fax Numbers	Date
Jeffrey K. Horton	TDEC-DWR/JC EFO/(423) 854-5447/(423) 854-5401 Fax	

ATTACHMENT 1
AGC Flat Glass North America – Greenland Plant (TN0002631 & TNR051221)
SECTION D: Summary of Findings/Comments

1. Revisions to Title 40 CFR Part 136, including more explicit laboratory quality assurance and quality control requirements detailed in §136.7, became effective June 18, 2012. AGC should carefully evaluate the revisions as well as internal policies and procedures and make any necessary changes to ensure regulatory compliance.
2. Records for laboratory analyses performed onsite listed analytical method editions no longer approved for use in Title 40 CFR Part 136. NPDES permit TN0002631 Part I B.3. requires analyses be performed using methods prescribed in Part 136. In accordance with permit Part I B.4., records must accurately reflect the analytical methods used.
3. Records for laboratory analyses performed by Environmental Science Corporation indicated use of EPA method 365.2 for Total Phosphorus analyses. This method is not approved for use in Title 40 CFR Part 136. Later during this inspection, AGC representatives indicated that the laboratory had stated this was only a documentation error. Also, analyses performed using methods from *Standard Methods for the Examination of Water and Wastewater* did not indicate the edition number or date of adoption. NPDES permit TN0002631 Part I B.3. requires analyses be performed using methods prescribed in Part 136. In accordance with permit Part I B.4., records must accurately reflect the analytical methods used.
4. The colorimeter used for total residual chlorine analyses performed onsite is only calibration checked using secondary gel standards. Colorimeter calibration must instead be checked using primary standards as discussed in Standard Method 4500-Cl G-2000 at least once per month and checked using a blank and secondary gel standards bracketing the expected range of readings before each daily use. Analyses must be performed in accordance with methods prescribed in Title 40 CFR Part 136 as required by NPDES permit Part I B.3. See additional guidance information enclosed with this report.
5. Mr. Paul McKenzie indicated that internal outfall 001 effluent samples are collected before the onsite settling basins. Outfall samples should be collected downstream of all treatment steps.
6. NPDES permit TN0002631 Part III E. requires outfall 004 biomonitoring tests be conducted using flow-proportionate composite samples of final effluent. Based on the equipment in place at the outfall, it is unclear how this requirement is being satisfied.
7. Sample analysis results are transferred from laboratory reports and bench sheets into a spreadsheet to perform calculations for use in compliance reporting on Discharge Monitoring Reports (DMRs) submitted to the division. Examination of selected records from 2010 through 2012 revealed the presence of multiple transcription errors wherein data was omitted or entered into the wrong date in the spreadsheet. The discrepancies noted did not impact the values reported on submitted DMRs; however, the division recommends this data entry process be subjected to additional checks to ensure accuracy. Accurate reporting using all valid sample results is essential to NPDES permit compliance.
8. The facility storm water pollution prevention plan (SWPPP), required by TMSP TNR051221, contains some confusing or outdated language regarding the current facility configuration. In addition, the current pollution prevention team does not appear to identify individuals responsible for some functions required by TMSP part 11.E.3.2.1, and the site map does not include all information required by part 11.E.3.2.2.1. The plan, including associated maps and forms, must be updated to accurately reflect current

facility configuration and operation and to address all required components specified in TMSP Parts 1. through 10. and Sector E.

9. Records for quarterly visual examinations of storm water quality must include sufficient documentation to show sampling during a qualifying storm event and within the first 30 minutes of discharge (not to exceed one hour) in accordance with TMSP part 11.E.5.3.1. When sampling is not done within the first 30 minutes, monitoring records should indicate why this was impracticable.
10. The facility SWPPP and related reports, such as those for the annual Comprehensive Site Compliance Evaluation and Quarterly Visual Examination of Storm Water Quality, required by applicable TMSP Sector E must be signed in accordance with the requirements of TMSP part 7.7.

The Use of Secondary Standards for Spectrophotometer/Colorimeter Calibration

Secondary standards (gel standards) are specifically designed to verify the instrument's calibration and to check the instrument's performance. They are not intended to be used to create calibration curves or to calibrate the instrument. Because the DPD reagent cannot be mixed with the gel standards, the quality and the reaction time of the reagent cannot be assessed. For these reasons gel standards cannot take the place of primary standards.

The analyst is responsible for the following:

- Preparing the calibration curve for each instrument once per month at a minimum, before the use of new DPD reagents, or the use of new gel standards
- Recording reagent lot #'s for reagents and standards
- Recording calibration concentrations
- Verified the calibration curve using a minimum of one blank and two gel standards that bracket the expected sample concentration
- Recording all verification data

STOCK STANDARD SOLUTION

0.891 grams of reagent grade $KMnO_4$ in 1000 mL vol. flask made to mark with deionized water. Deionized water must never be stored in plastic containers or exposed to airborne contamination. Store the stock solution in amber bottle in a cool area. The typical shelf life of the stock solution is six (6) months. If solids appear in the solution, **do not use.**

*****Avoid leaving the cap off for extended periods of time and avoid contamination.*****

INTERMEDIATE (WORKING) STANDARD SOLUTION (10 mg/L)

10 mL of *STOCK* made in *1000* mL vol. flask made to mark with deionized water. The flask should be labeled with the name, $KMnO_4$, date of preparation, initials of who made it.
This information should also be entered into a logbook.
****The intermediate stock solution should be stable for approximately 5 days if kept cool and away from light.****

Care should be taken that the pipette and glassware are clean and thoroughly rinsed with deionized water to avoid contamination. Store only in glass container (preferably amber glass) never in plastic containers. The working solution should be remade if solids appear in the bottom of the container.

CALIBRATION STANDARD SOLUTIONS

Four to five calibration standard solutions should be made according to the table below to create a calibration curve ***once per month*** at a minimum. The linear regression of the curve should correlate to 0.995 or better. This curve is then used to check or calibrate the instrument. Gel standards are run against the curve and must agree to within ± 10%.
****The working solution should be stable for approximately 2 hours and will fade rapidly (within 15 minutes) if chlorine demand-free water is not used.****

A target value (e.g. permit value for a facility) should be known and three gel standards, 0.00 mg/L, blank, and two other standards (a low and a high standard) that bracket the target value should be chosen. Gel standards are run against the curve and must agree to within ± 10%.

mL Working Standard Diluted w/Deionized water	Chlorine Equivalent mg/L
20 mL (vol. Pipette) to **100** mL (vol. flask)	**2.0** mg/L
10 mL (vol. Pipette) to **100** mL (vol. flask)	**1.0** mg/L
5 mL (vol. Pipette) to **100** mL (vol. flask)	**0.5** mg/L
1 mL (vol. Pipette) to **100** mL (vol. flask)	**0.1** mg/L
1 mL (vol. Pipette) to **200** mL (vol. flask)	**0.05** mg/L
1 mL (vol. Pipette) to **500** mL (vol. flask)	**0.02** mg/L
100 mL of deionized water	**0.00** mg/L

Total Residual Chlorine, SM 4500-Cl G, 22nd edition (2000) – DPD Colorimetric Method

Minimum detectable concentration – 4500-Cl G.1.c. – approximately 10 µg/L (0.010 mg/L)

Initial demonstration of capability

- 1020 B. 1 – As a minimum, include a reagent blank and at least 4 LFBs at a concentration between 10 times the MDL and the midpoint of a calibration curve.
    - Upper Control Limit = Mean + 3(Standard deviation)
    - Lower Control Limit = Mean - 3(Standard deviation)
- 4020 B.1.a. - each analyst must run a known standard concentration at least four times and compare limits listed in the method.
- **Real people language – each operator running this test needs to analyze 4 samples of $KMnO_4$ at a concentration of 0.5 mg/L**
    - **Keep a folder for each analyst, keep a copy here**

Method Detection Limit

- 1020 B. 4 – As a starting point for selecting the concentration to use when determining the MDL, us an estimate of five times the estimated true detection level (5 x 0.010 mg/L = 0.050 mg/L).
    - Ideally, prepare and analyze at least seven (7) portions of this solution over a 3-day period to ensure that the MDL determination is more representative of routine measurements as performed in the laboratory.
    - The replicate measurements should be in the range of one to five times the estimated MDL, and recoveries of the known addition should be between 50 and 150%, with %RSD (relative standard deviation) values ≤ 20%.
- 4020 B.1.b. – Verify MDL at least ***annually***.
    - Ideally use pooled data from several analysts rather than data from one analyst.
- **Real people language – have several operators, who run this test, analyze $KMnO_4$ at a concentration of 0.05 mg/L over several days with a total of at least 7 samples**
    - **Joe analyzes 3 samples on Monday**
    - **Bob analyzes 3 samples on Tuesday**
    - **Mary analyzes 3 samples on Wednesday**
- **Run this once a year**

Initial Calibration Verification

- 1020 B.11.b. – Perform initial calibration using at least three concentrations of standards for linear curves.
- 4020.B.2.a. – Calibrate initially with at least one blank and three calibration standards.
    - The appropriate linear correlation coefficient for standard concentration-to-instrument response should be greater than or equal to 0.995.
    - The back-calculated and true concentrations should agree within ± 10%.
- **Real people language – prepare a set of $KMnO_4$ in accordance with Guidance for Secondary Stds use in Calibration 10-19-2012 monthly.**

Method Blank

- 1020 B.5.– A reagent blank (method blank) consists of reagent water and all reagents that normally are in contact with a sample during the entire analytical procedure.
- 4020 B.2.d. – Include at least one method blank ***daily*** or with each batch of 20 or fewer samples, whichever is more frequent.

- If any method blanks measurements are at or above the reporting level, take immediate corrective action.

- **Real people language – analyze distilled water as a sample by adding a DPD powder pillow and waiting the 3-6 minutes before reading**
  - **Target value is zero**
  - **Do this every day you analyze total residual chlorine**

Laboratory Fortified Blank

- 1020 B.6.– A laboratory-fortified blank is a reagent water sample to which a known concentration of the analyte of interest has been added.
  - Sample batch = 5% basis = 1 every 20 samples
  - Use an added concentration of at least 10 times the MDL, less than or equal to the midpoint of the calibration curve.
- 4020 B.2.e. – Calculate percent recovery, plot control charts and determine control limits
- **Real people language – analyze potassium permanganate sample at a concentration of 0.5 mg/L**
  - **Run on a 5% basis, see batch size for more information**

Duplicate –

- 1020 B.12.f. – Calculate RPD (relative percent difference)
- 4020 B.2.f. – Randomly select routine samples to be analyzed twice.
  - Process duplicate sample independently through the entire sample preparation and analysis.
  - Include at least one duplicate for each matrix type daily or with each batch of 20 or fewer samples.
- **Real people language – analyze 2 samples for chlorine, after reading one, pour out sample and start with a fresh sample**
  - **Target value is to get close to the first value and have a small RPD**

Laboratory Fortified Matrix (LFM)/Laboratory Fortified Matrix Duplicate (LFMD)

- 1020 B.7.– A laboratory fortified matrix (LFM) is an additional portion of a sample to which a known amount of the analyte of interest is added before sample preparation
  - The LFM is used to evaluate analyte recover in a sample
  - Sample batch = 5% basis = 1 every 20 samples
  - Add a concentration that is at least 10 times the MRL (minimum reporting level), less than or equal to the midpoint of the calibration curve.
  - Preferably use the same concentration as the LFB
- 4020 B.2.g. – When appropriate for the analyte, include at least one LFM/LFMD daily or with each batch of 20 or fewer samples
  - Add a known concentration of analyte (ideally from a second source) to a randomly selected routine sample without increasing its volume by more than 5%
  - Calculate percent recovery and relative percent difference, plot control charts and determine control limits for spikes at different concentrations
- **Real people language – add a known amount of chlorine to a sample and expect that amount to increase your sample concentration**
  - **Hach's method uses 0.1 mL increments, therefore spiking volume is 1% of total sample volume**
  - **If you have a chlorine standard solution that is 50 mg/L of Cl_2, when you add 0.1 mL to a 10 mL sample, that should increase your sample concentration by 0.5 mg/L Cl_2**

- **Example from Hach's method from their Instruction Manual for Pocket Colorimeter II:**

Accuracy Check

Standard Additions Method

1. Use the ampule breaker to snap the neck off a Chlorine Standard Solution Ampule, 50–75 mg/L Cl_2.
2. Use a TenSette® pipet to add 0.1, 0.2, and 0.3 mL of standard to three 10-mL samples. Swirl gently to mix.
3. Analyze a 10-mL aliquot of each sample as described in the procedure. Each 0.1 mL of standard will cause an incremental increase in chlorine. The exact value depends on the concentration of the ampule standard. Check the certificate enclosed with the ampules for the chlorine concentration and calculation of the expected chlorine increase.

Continuing Calibration Verification

- 1020 B.11.c. – Analysts periodically use a calibration standard to confirm that the instrument performance has not changed significantly since initial calibration.
  - Verify calibration by analyzing one standard at a concentration near or at the mid-point of the calibration range.
- 4020.B.2.b. – Verify calibration by periodically analyzing a calibration standard and calibration blank during a run – typically after each batch of 10 samples and at the end of the run.
  - For the calibration verification to be valid, check standards must not exceed 10% of its true value, and calibration blank results must not be greater than one-half the reporting level
- **Real people language – read Secondary Standards in accordance with Guidance for Secondary Stds use in Calibration 10-19-2012 daily.**

Control Charts – 1020 B.13.

Corrective Action - 1020 B.5., B.8,. & B.15.

Batch Size –

- For samples that need to be analyzed on a 5% basis or once for every 20 samples follow these criteria:
  - If a permit stated that 3 analyses per week, we would allow for a duplicate to be analyzed at least once per month.
    - Pick a date and be consistent, the 1st of every month or the 1st Thursday of every month. Mark your calendar!!
  - If a permit stated 5 analyses per week, we would suggest twice a month.
    - Pick a date and be consistent, the 1st and 15th of every month or the 1st and 3rd Thursday of every month. Mark your calendar!!

Calculations –

- % Recovery for LFB
  - $= \frac{\text{LFB concentration}}{\text{Expected concentration}} \times 100\%$
- RPD – relative percent differences for duplicates and LFM/LFMD
  - $= \frac{\text{Difference between sample and duplicate}}{\text{Average of the sample and duplicate}} \times 100\%$

- % Recovery for LFM – when using less than or equal to 1% spike volume compared to sample volume
    - $= \frac{\text{LFM concentration} - \text{Sample concentration}}{\text{Concentration of spike}} \times 100\%$